REMARKS

Applicant respectfully requests that the foregoing amendments be made prior to examination of the present application.

After amending the claims as set forth above, claims 1-18 and 42-64 are now pending in this application.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

Date <u>July 9, 2001</u>

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Attached: Attachment A

Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge deposit account No. 19-0741 for any such fees; and applicant hereby petitions for any needed extension of time.

002.606201.1

Marked up version of specification changes in Preliminary Amendment filed on July 9, 2001

Page 86, first full paragraph

In this embodiment UNDX (Ono, I. And Kobayashi, S: A Real-coded Genetic Algorithm for Function Optimization Using Unimodal Normal Distribution Crossover, Proceeding of 7th International Conference on Genetic Algorithms, pp. 246-253 (1997)) is adopted as a crossover operator. The UNDX generates, from two parents of parent 1 and Parent 2 out of selected parents, two children according to a normal distribution set around them, as shown in Fig. 27. The standard deviation of the normal distribution is set so that a component $\sigma 1$ along the major-axis direction connecting the both parents is proportional to a distance between the parents ($\sigma 1 = \alpha d1$ where d1: the distance between Parent 1 and parent 2) and so that a component $\sigma 2$ along the other axis is proportional to a distance between the major axis and Parent 2 ($\sigma 2 = \beta d[3]\underline{2}$, where d[3]$\underline{2}$: the distance between parent 3 and the axis connecting parent 1 with Parent 2). Fig. 27 illustrates an example of two variables.

Page 92, second full paragraph

Fig. 38 shows a state in which the best solution P (the lens system shown in Fig. 31) obtained in Experiment 1 of the first embodiment described above is plotted on the enlarged view of Fig 37. In the drawing letter [S]$\underline{Q}$ indicates lens systems dominating the solution found by the single-objective optimization of the evaluation criteria. As also apparent from this Fig. 38, it is clearly seen that the second embodiment (multi-objective optimization) obtains many more excellent solutions that that obtained by the single-objective GA. This conceivably suggests that there is a possibility of making the problem harder if the multi-objective problem is forced to the single-objective problem.

Page 96, first full paragraph

Fig. 39 is a schematic diagram of the structure of the photographic lens system. In this figure g designates the image plane. The photographic lens system of this figure is an example of the three-lens configuration, in which there are six boundary

surfaces of a to [g]f having their respective curvatures, and six distances of d1 to d6 between the boundary surfaces (d1 between A and B, d2 between B and C, d3 between C and D, d4 between D and E, d5 between E and F, and d6 between F and G).

Page 100, second full paragraph

Fig. 41 illustrates a gene representation of ten parameters of continuous values featuring the lens system in the three-lens configuration shown in Fig. 39. In each of [a-g] a-e and d1-d5 in the same drawing a parameter of the corresponding lens system is stored in the form of continuous value. Among such genes, n (n > 1) genes satisfying the minimum constraints are reproduced arbitrarily.

Page 112, first full paragraph

The n-dimensional coordinates of the point P4 reproduced by above steps ST4-1 to ST4-6 correspond to the n parameters a, b, c, d, e, [f,] d1, d2, d3, d4, d5 of a chromosome of a new-born gene or a child. In this step ST4 of the fourth embodiment the substeps ST4-1 to ST4-6 described above are repeated m times, whereby m new genes are reproduced from the three parents Pa1, Pa2, Pa3.

Page 116, second full paragraph

In the case of the multi-objective optimization, steps [S11] ST110 and [S15 AND S17] ST150-ST170 below are executed in place of above steps ST1 and ST5-ST7.

Page 122, second full paragraph, lines 7-13

Size of initial population: 50

Number of Crossovers: 300,000

Number of children generated by crossover operator: 20

σa of UNDX: 0.5 x VC1VC2

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σb of UNDX: 1

σc of UNDX: $0.35 \times (VC1VC2)^{1/n}$